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Detection of magnetic field in the B2 star ρ Ophiuchi A with ESO FORS2

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Abstract

© ESO, 2018. Circumstantial evidence suggests that magnetism and enhanced X-ray emission are likely correlated in early B-Type stars: similar fractions of them (~10%) are strong and hard X-ray sources and possess strong magnetic fields. It is also known that some B-Type stars have spots on their surface. Yet up to now no X-ray activity associated with spots on early-Type stars was detected. In this Letter we report the detection of a magnetic field on the B2V star ρ Oph A. Previously, we assessed that the X-ray activity of this star is associated with a surface spot, herewith we establish its magnetic origin. We analyze spectra of ρ Oph A obtained with the FORS2 spectrograph at ESO Very Large Telescope (VLT) at two epochs, and detect a longitudinal component of the magnetic field of the order of ~500 G in one of the datasets. The detection of the magnetic field only at one epoch can be explained by stellar rotation which is also invoked to explain observed periodic X-ray activity. From archival HARPS ESO VLT high resolution spectra we derived the fundamental stellar parameters of ρ Oph A and further constrained its age. We conclude that ρ Oph A provides strong evidence for the presence of active X-ray emitting regions on young magnetized early type stars.

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Keywords

Pulsars: individual: ρ Ophiuchi A, Stars: Activity, Stars: early-Type, Stars: magnetic field

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